Reg. No.



II SEMESTER M.TECH (ESM/PED) END SEMESTER EXAMINATIONS APRIL - MAY 2017

SUBJECT: DISTRIBUTED ENERGY SYSTEMS [ELE 5202]

REVISED CREDIT SYSTEM

Time	: 3 Hours Date: 22 April 2017	Max. Mark	s: 50		
Instructions to Candidates:					
	 Answer ALL the questions. 				
	Missing data may be suitably assumed.				
1A.	Explain distributed energy system with a proper block diagram and state some of its	s features.	(05)		
1B.	What are the different energy storage technologies available and briefly explain abo energy storage technologies?	ut any two	(03)		
1C .	What are the advantages with distributed energy resources?		(02)		
2A	Explain about the working principle of P&O (Perturb and observe) MPPT algor flowchart and its steady state behaviour.	rithm with	(03)		
2B.	What is the role of adaptive MPPT algorithms in PV systems and describe implementation procedure through a proper block diagram	about its	(03)		
2C.	What is the criteria for the selection of proper MPPT parameters (i.e., Perturbatio and perturbation time)	n step size	(02)		
2D.	For the design of a stand-alone PV system with an average power of 10 kW at MI with a capacity factor of $K_{cf,PV} = 10\%$, how many 200 W, PV modules are required?	T Manipal, ,	(02)		
3A.	Define power coefficient in Wind Energy conversion System and prove that its maximis 59%.	num value	(05)		
3B.	Describe the functioning of any two maximum power point tracking control tech wind energy conversion system with proper block diagram/Flow chart.	niques for	(03)		
3C.	Draw the block diagram of a grid connected wind Energy conversion system a describe about each block/component.	ind briefly	(02)		
4A.	Design a standalone distributed energy system with the following specifications:				
	Load profile parameters: $P_{dem, min} = 1 MW$, $P_{dem, max} = 10 MW$, $\overline{P}_{dem} = 7 MW$;				
	$K_{cf_wtg} = 16\%$, $K_{cf_PV} = 10\%$ are the capacity factors of wind turbine gene Photovoltaic system respectively. Assume that the system is operating with physical energy conversion system and battery bank as an energy storage.	rator and otovoltaic,			
	 i) If P_{PV, rated} = 30 MW, what should be the rated power of Wind energy converse (WECS)? 	ion system			
	ii) For the generation of the rated power from WECS, how many 1000 kW with	nd turbine			

generator units required. iii) What is the maximum possible excess power generated by considering the given capacity

(03)

factors of the sources?

4B	Explain about power management strategy in standalone distributed energy system by considering PV, wind, fuel cell, Electrolyzer, battery bank and give a flowchart for the same	(04)
4C	Explain about the functioning of Fuel cell, solar thermal power generation technologies through a proper diagram.	(03)
5A.	What are the challenges in Grid integration of distributed energy resources?	(03)
5B.	For a grid connected distributed energy system, which parameters influence the active power and reactive power and prove it by considering an example.	(03)
5C.	What are standards set by CEA (Central Electricity Authority) for voltage range, frequency range, harmonics, flicker, for the grid connection of distributed energy resources in INDIA?	(04)